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# GET CONNECTED

## with Future Connectivity Solutions

ISSUE 01

**FEATURED TECHNOLOGIES**

802.15.4
Antennas
Bluetooth
Cellular
GPS/GNSS
Wi-Fi

**FEATURED TECHNICAL VIEW**

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by Allen Cabreros

**NEW PRODUCT INTRODUCTIONS**

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Taking the world wireless

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FUTURE Connectivity Solutions

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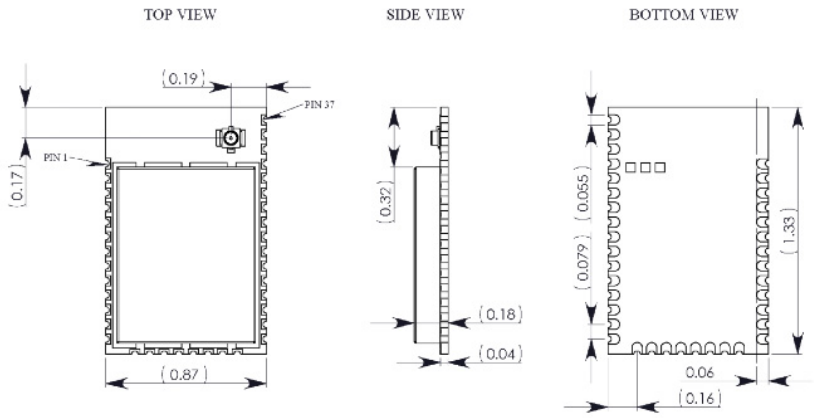
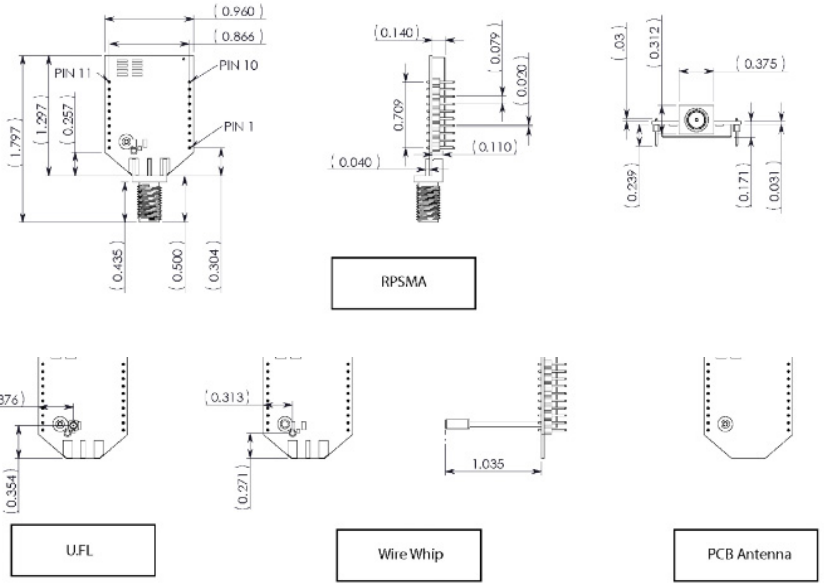
# XBee Wi-Fi embedded RF modules

XBee Wi-Fi Cloud Kit
Surface mount version :




Through-hole version :




XBee® Wi-Fi® embedded RF modules provide simple serial to IEEE 802.11b/g/n connectivity. By bridging the low-power/low-cost requirements of wireless device networking with the proven infrastructure of 802.11, the XBee Wi-Fi creates new wireless opportunities for energy management, process and factory automation, wireless sensor networks, intelligent asset management and more. Featuring easy provisioning methods and native Device Cloud by Etherios™ connectivity, XBee Wi-Fi modules give developers the fastest IP-to-device and device-to-cloud capability possible.

Upcoming firmware releases will include native Device Cloud connectivity, enabling customers to quickly and easily send data to a cloudbased application. Other features expected in a future firmware release are Soft AP mode, which allows customers to connect directly to a basic WebUI on the module for provisioning and basic configuration, along with Wi-Fi Protected Setup (WPS) for simple provisioning.

## FEATURES

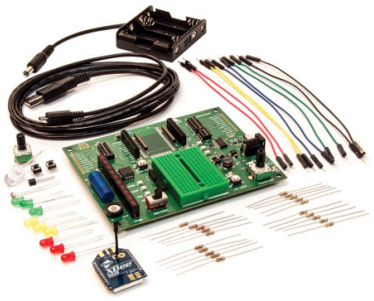
- Common Through-Hole and Surface Mount XBee footprints available
- Flexible SPI and UART serial interfaces
- RPSMA, PCB, U.FL and wired whip antenna options
- Supports Device Cloud connectivity for data acquisition and device management
- 802.11n provides up to 72 Mbps data rate

## APPLICATIONS

- Solar Inverters
- Gas Sensors
- Wireless firefighting equipment
- Scoreboards

## Part # : XKA2B-WFT-0

- (1) XBee Wi-Fi (S6B) Module
- (1) XBee USB Development Board w/ Breadboard
- Package of components including resistors, relay, buttons, and LEDs
- Access to our cloud-based application, designed specifically for the XBee Wi-Fi Cloud Kit
- All necessary antennas, power supplies, and cables

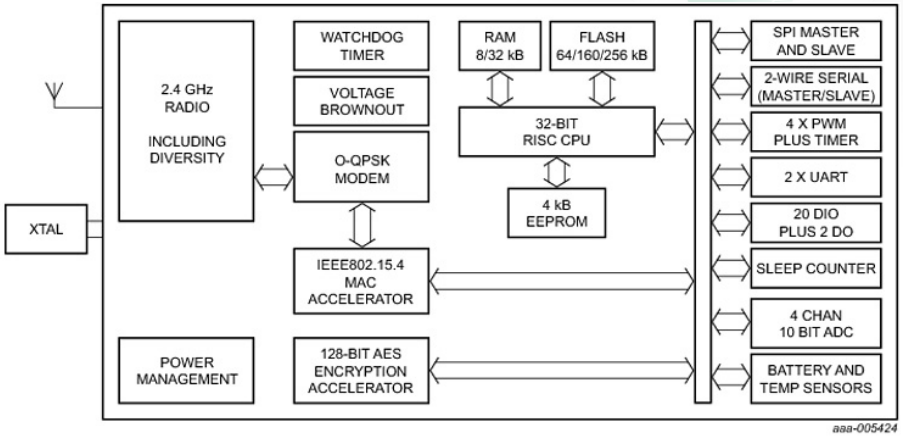


| Part Number | Description |
|---|---|
| XB2B-WFPS-001 | XBee Wi-Fi (S6B), PCB Antenna, SMT |
| XB2B-WFPT-001 | XBee Wi-Fi (S6B), PCB Antenna, Through-Hole |
| XB2B-WFRS-001 | XBee Wi-Fi (S6B), RF Pad Antenna, SMT |
| XB2B-WFST-001 | XBee Wi-Fi (S6B), RPSMA Antenna, Through-Hole |
| XB2B-WFUS-001 | XBee Wi-Fi (S6B), U.FL Antenna, SMT |
| XB2B-WFUT-001 | XBee Wi-Fi (S6B), U.FL Antenna, Through-Hole |
| XB2B-WFWT-001 | XBee Wi-Fi (S6B), Wire Antenna, Through-Hole |

# JN5168-001-Myy JenNet-IP, ZigBee PRO and IEEE802.15.4 Module

**The JN5168-001-Myy family is a range of ultra low power, high performance surface mount modules targeted at IEEE 802.15.4, JenNet-IP, ZigBee Light Link, ZigBee Smart Energy and RF4CE networking applications, enabling users to realise products with minimum time to market and at the lowest cost. They remove the need for expensive and lengthy development of custom RF board designs and test suites.**

The modules use NXP's JN5168 wireless microcontroller to provide a comprehensive solution with large memory, high CPU and radio performance and all RF components included. All that is required to develop and manufacture wireless control or sensing products is to connect a power supply and peripherals such as switches, actuators and sensors, considerably simplifying product development.




## APPLICATIONS

- Robust and secure low power wireless applications
- ZigBee and JenNet-IP networks
- Home and commercial building automation
- Utilities metering (e.g. AMR)
- Location Aware services (e.g. Asset Tracking)
- Toys and gaming peripherals
- Industrial systems
- Telemetry
- Remote Control

## BENEFITS

- Microminiature module solutions
- Ready to use in products
- Minimises product development time
- No RF test required for systems
- Compliant with : FCC 47CFR Part 15C / IC Canada RSS 210 Issue 8 - Annex 8 / ETSI EN 300-328 V1.7.1 / EN 301-489-17 V2.1.1 / EN60950-1-2006 +A1, A11, A12

## FEATURES

- 2.4 GHz IEEE 802.15.4
- Jen Net - IP
- Zigbee Light Link
- Zigbee Smart Energy
- RF4CE Compatible

## JN5168-001-M00/03 up to 1km range (Ext antenna) M00

integral antenna 16x30mm
M03: uFl connector 16x21mm

- TX power +2.5dBm
- Receiver sensitivity –95dBm
- TX current 15.3mA
- RX current 17mA
- 2.0-3.6V operation

## JN5168-001-M05

up to 2km range (Ext 2dBi Antenna)

- 9.5 dBm TX Power
- Receiver sensitivity -96dBm
- uFl connector
- TX current 35mA
- RX current 22mA
- 16x30mm
- 2.0-3.6V operation

## JN5168-001-M06

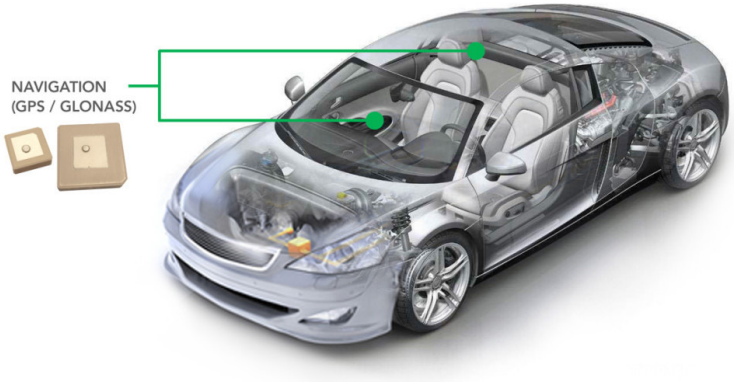
up to 6km range (Ext 2 dBi Antenna)

- 22dBm TX Power
- Receiver sensitivity -100dBm
- uFl connector
- TX current 175mA
- RX current 22mA
- 16x30mm
- 2.0-3.6V operation

| Part Number | Description |
|---|---|
| JN516X-EK001 | The JN516X-EK001 evaluation kit enables the development of systems that run ZigBee, JenNet-IP, or IEEE 802.15.4 network |
| JN5168-RD6040 | Internet of Things (IoT) Gateway |

# YAGEO GPS/Glonass ceramic patch antennas

Yageo's GPS/Glonass ceramic patch antennas are ideal for automotive applications. The GPS patch antenna technology has been proved across industry to be the best antenna technology for receiving GPS signals.




## FEATURES

- Support GPS & GLONASS system
- Accurate GPS performance
- High radiation efficiency
- Pin-solder process
- Frequency: 1575/1602 MH

## APPLICATIONS

- Navigation device
- Telematics box
- Fleet management
- Tablet PC

| Part Number | Description |
|---|---|
| ANT1818B00BT1516A | 1575 to 1602 MHz 1.89 dbi 2 VSWR Ceramic Patch Antenna 18 x 18 mm |
| ANT2525B00BT1516A | 1575 to 1602 MHz 4.1 dbi 2 VSWR Ceramic Patch Antenna 25 x 25 mm |
| ANT2525B00BT1575A | 1.575 GHz 5.5 dBi Single Band Ceramic Patch Antenna 25 x 25 mm |
| ANT2525B00FT1575A | 1.575 GHz 5.5 dBi Single Band Ceramic Patch Antenna 25 x 25 mm |

# YAGEO WLAN/BT/ZigBee Ceramic Chip Antenna

## FEATURES

- Compact size
- Omni-directional radiation
- Tape & reel automatic mounting
- Reflow process compatible
- RoHS compliant

## APPLICATIONS

- 2.4 GHz WiFi device
- Bluetooth gadget
- ZigBee devices
- ISM band equipment

| Part Number | Description |
|---|---|
| ANT5320LL24R2455A | 2.4 / 5 GHz 2.17 / 3.51 dbi 1 W 50 Ohm Ceramic Chip Antenna 5.3 x 2.2 mm |

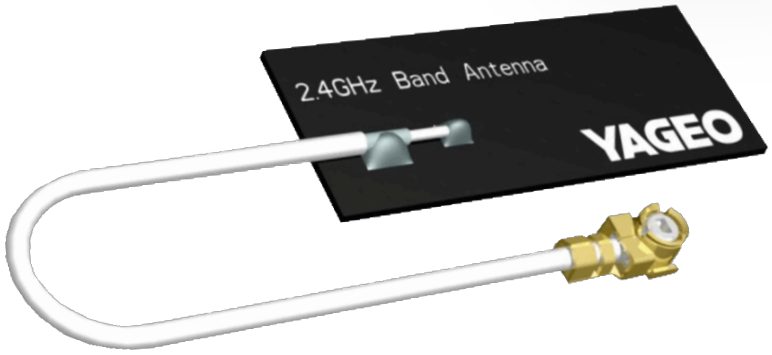
# YAGEO WLAN/BT/ZigBee 2.4GHz PCB Antenna

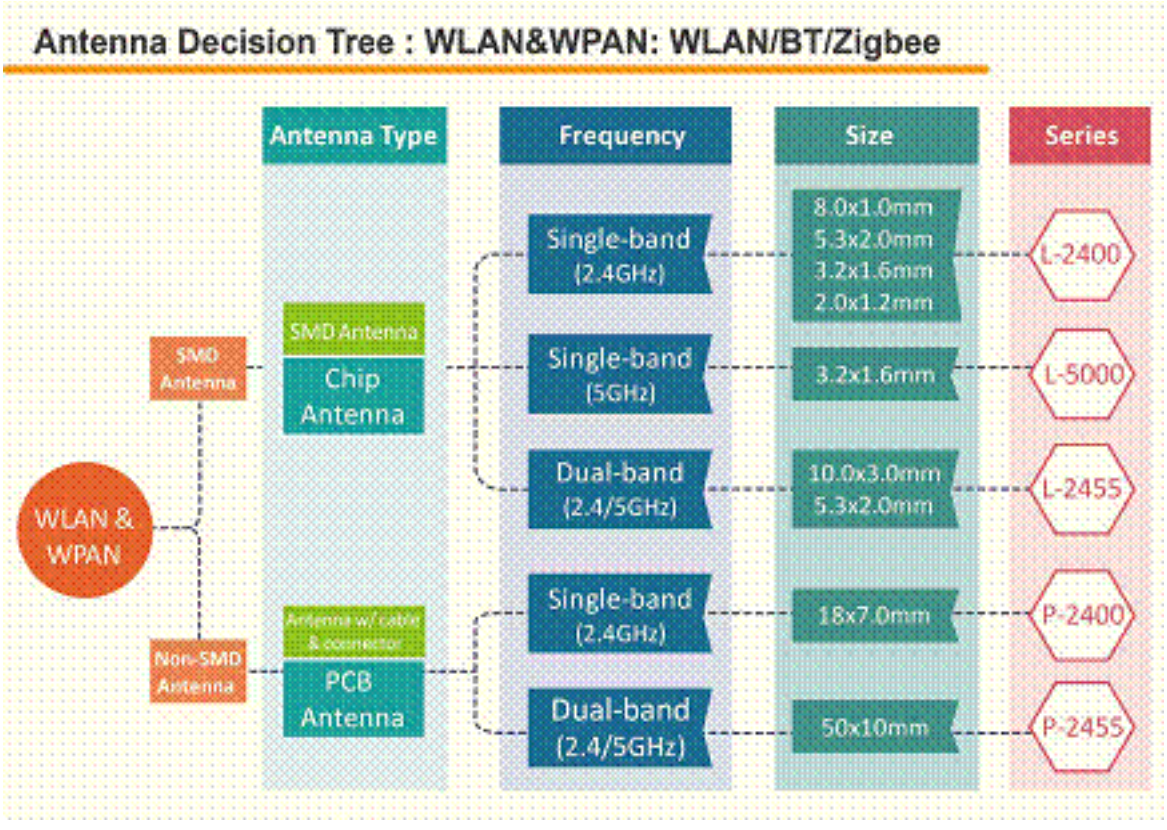
## FEATURES

- The smallest PCB antenna in the market
- Miniature design allows users to save required space
- Double-side adhesive tape makes it easy to install in device
- Ranges of types of connector and cable provide a flexible design options

## APPLICATIONS

- Tablet / Desktop PC
- Internet TV / STB / Game console / Camera
- WiFi network devices (IEEE 802.11b/g/n)
- Bluetooth / ZigBee devices
- Car Infotainment
- Smart meter
- Lighting control
- POS terminal
- Wireless Industrial Control



# Smart About Bluetooth® Smart

By: Allen Cabreros, Advanced Engineer Future Electronics

**Bluetooth® Smart wireless technology is the new ultra-power efficient, app-friendly version of Bluetooth® transforming the low power wireless industry. This technology is rapidly opening new opportunities and applications in industry verticals from consumer electronics, medical devices and home automation to retail and wearables. We at the Future Connectivity Solutions (FCS) group are dedicated to providing Bluetooth® Smart solutions to meet the rapid growth and demand in the low power wireless market. FCS is partners with STMicroelectronics, Dialog Semiconductor, Murata, Panasonic, Cypress Semiconductor and Microchip Technology to provide the latest and fastest time to market solutions. Bluetooth® Smart is also important technology in driving the Internet of Things (IoT), which has a strong focus from Future Electronics and the listed partners.**

While the power efficiency of Bluetooth® Smart devices from various suppliers makes it perfect for devices needing to run off tiny batteries for long periods, one of the big drivers of the technology behind Bluetooth® Smart is its ability to work with a wide variety of applications on smartphones or tablets consumers already own. The developer friendly Bluetooth® Smart architecture is now supported by all major operating systems natively. This makes it easy for developers to create apps that link with everyday objects like heart rate monitors, toothbrushes, and even shoes. With Bluetooth® Smart, developers are only limited by their imaginations. In a 2013 market research from ABI, the world market forecast is showing total shipments of Bluetooth® Smart and Bluetooth® Smart Ready devices will double Bluetooth® "Classic" shipments in 2014.

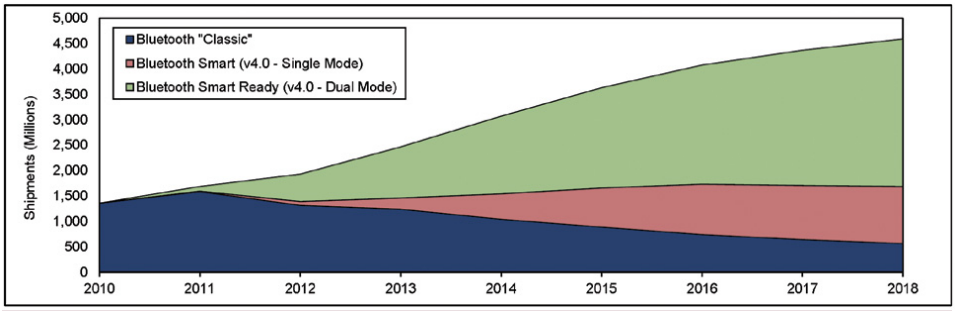



Figure 1: Source: ABI Research; Bluetooth® Service

### What is Bluetooth® Smart?

Bluetooth® Smart, previously known as Bluetooth® Low Energy or BLE, is an ultra-low power radio technology that is designed with the coin cell battery in mind and sending short bursts of small data in an infrequent amount of time with low latency.

Bluetooth® Smart was formed from previously announced technology known as Wibree from Nokia. Nokia announced Wibree in 2007: "Wibree is a new interoperable radio technology for small devices. It can be built into products such as watches, wireless keyboards, gaming and sports sensors, which can then connect to host devices such as mobile phones and personal computers. It is essential the missing link between small devices and mobile devices/personal computers." However, the technology lacked a protocol structure for interoperability. Wibree was then integrated by the Bluetooth® Special Interest Group and in 2010 the Bluetooth® 4.0 Low Energy specification was ratified.

### What Applications are Fit for Bluetooth® Smart?

Bluetooth® Smart is meant for low bandwidth and low latency data that is sent infrequently. If you ask what the maximum throughput of Bluetooth® Smart is for your application, then it might not be the right technology. Bluetooth® Smart is great for state types of data. State data is where ANT/ANT+ and ZigBee play well with in regard to command and control (on/off), monitoring low resolution sensors, and status indication. Pedometers, heart rate monitors, thermometers, accelerometer positioning data, and proximity sensing are all great low bandwidth, low latency types of applications. Bluetooth® Classic has been used for data "cable replacement" applications, while Bluetooth® Smart is viewed as a "wire replacement" technology.

### Bluetooth® Smart vs. Bluetooth® Classic

In order to achieve the ultra low power consumption, changes were made to the existing Bluetooth® Baseband, Link Management Layer and upper data management layers (L2CAP). One of the obvious changes to achieve the ultra-low power consumption, was in the radio duty-cycle, link management and link establishment. Although the GFSK modulation is still the same with Bluetooth® Classic, the application throughput is reduced to a theoretical throughput of ~0.27 Mbit/s from 0.7–2.1 Mbit/s.

The new Link Management Layer reduces radio duty cycle and adds new mechanisms to keep power consumption low but still add robustness and low latency to the link. For example, Bluetooth® Classic radio packets need to be acknowledged immediately by the receiving end before the next packet transmission. This means the receiving device has to transmit an ACK packet and stay awake for an additional time slot before deciding to go into a low power mode or stay awake to receive more data. In Bluetooth® Smart, the received packet does not need to be acknowledged right away and the device can go into low power mode for X amount of time and then later wake to send an ACK packet. The result allows the Bluetooth® Smart device to receive or even send data without burning precious battery life on acknowledgements.

Channel spacing, modulation index, max output power, and packet types are

other items that have changed to with Bluetooth® Smart. This means Bluetooth® Classic is not compatible with Bluetooth® Smart. Only Bluetooth® Smart and Bluetooth® Smart Ready devices can communicate with each other. Bluetooth® Smart Ready devices support both Bluetooth® Classic and Bluetooth® Smart, making it a dual mode device. There are new Smart Ready devices emerging quickly in the market today. Apple iPhone 4S and later, iPad 3 and later, recent Macbooks, Android devices and PC laptops are just a few devices that are Smart Ready today.

### New Roles and Data Modes

Bluetooth® Smart also defines new roles and device types. This is similar to the Master and Slave roles in Bluetooth® Classic. There are Central and Peripheral device role types within Bluetooth® Smart. Roles are defined in profiles and how services can be provided between Bluetooth® Smart and Bluetooth® Smart Ready devices. However, any device can be either role and switch between them.

A Central device's role performs the function of discovering, connecting and accessing the available services from the Peripheral device. Smartphones, Tablets, PCs are typically the Central device as they have displays and user interfaces to discover, connect, and view data and services from Peripheral devices.

A Peripheral device role performs functions such as advertisements, being discoverable and connectable to Central devices, and providing services. Typical Peripheral devices today are keyfobs, fitbits, watches, temperature sensors, mice or keyboard. Peripheral devices are typically Bluetooth® Smart only devices and would be battery powered.

### Advertisement Mode

One of the big advantages of Bluetooth® Smart is the ability to advertize and broadcast data without the need of establishing a complete connection. Establishing a complete connection would require a higher radio duty cycle consume more power. Some applications and data can use this advertisement mode to save power and do not require a bidirectional full duplex RF link. One example is a temperature sensor where temperature can be broadcasted periodically. A Central device would not need to create a full connection to the Peripheral device to obtain this small amount of temperature data.

In advertisement mode only 3 channels are used to broadcast the data. The 3 channels are dedicated for advertising, scanning and connecting of Bluetooth® Smart device. There are 37 other channels than can then be used for connection oriented data channels. This is a total of 40 channels with 2MHz spacing. Bluetooth® Classic uses 80 channels 1MHz spacing. The 3 advertising channels are strategically placed at 2402MHz, 2426 MHz and 2480 MHz to avoid the 3 non-overlapping WiFi channels of channel 1, channel 6 and channel 11. In an active connection there are still 9 channels that do not overlap with these WiFi channels. The 3 advertisement channels are also used to discover and create active connections between devices. After discovery and connection requests, the devices then start a frequency hopping spread spectrum (FHSS) scheme on the other 37 channels.

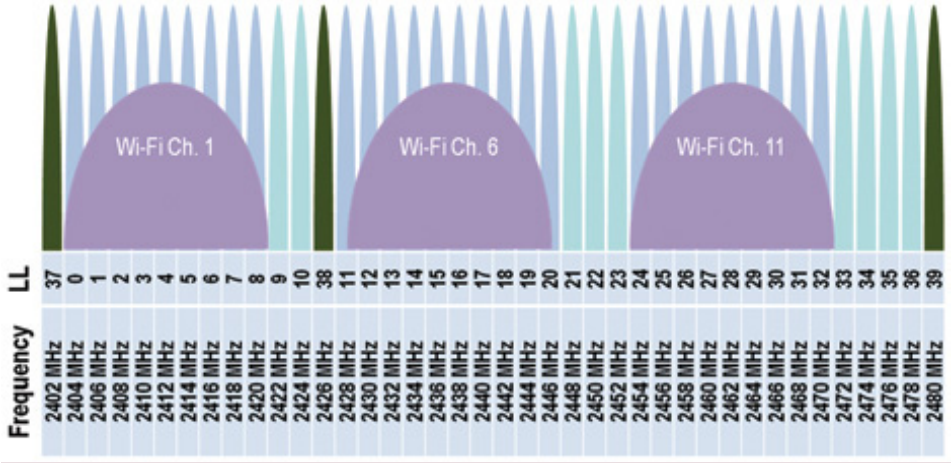



Figure 2: Bluetooth® Smart Channel Map with Wi-Fi

### New Data Structure – ATT and GATT

Previously, Bluetooth® Smart was mentioned as a "wire replacement" technology. However, the information is exchanged using a Client-Server model. It uses a service-based architecture based on the ATTribute protocol (ATT).

All communication in Bluetooth® Smart takes place over the Generic ATTribute profile (GATT). An application or another profile uses the GATT profile so a client and server can interact in a structured way. The server contains a number of attributes, and the GATT Profile defines how to use the ATT Protocol to discover, read, write and obtain data. The services are used as defined in the profile specifications and GATT enables you to expose these services and characteristics within the profiles specified.

Currently there are 18 GATT based profiles with defined attributes that are reserved. These attributes have universally unique identifiers (UUID). There are 16-bit, 32-bit and 128-bit UUIDs that can be used. The 16-bit and 32-bit are reserved for current and future Bluetooth® Smart applications and profiles. However, the 128-bit UUIDs can be used for proprietary use for custom profiles and applications for vendor specific data. There is the lack of a Serial Port Profile (SPP) in Bluetooth® Smart. Applications using SPP are basically proprietary data transfers. Custom GATT profiles are essentially the same concept of proprietary data transfers and can be used for the SPP-like implementation.

### Bluetooth® Smart Revision 4.1 Additions

In December of 2013, the Bluetooth® Special Interest Group ratified the 4.1 Core specification that added optional features to Bluetooth® Smart. Revision 4.1 extends functionality that is already provided in

revision 4.0 of the specification. All of the new 4.1 functions are optional and it does not change or add mandatory items to revision 4.0. This means 4.1 and 4.0 devices

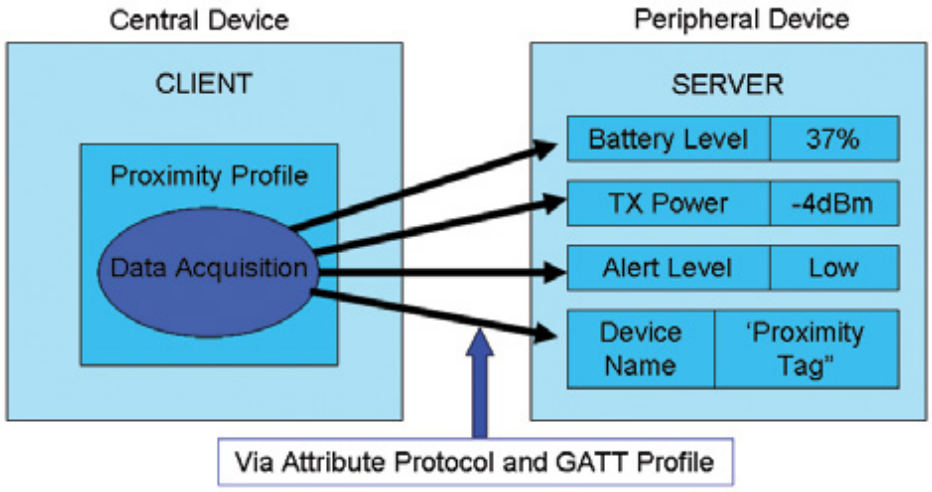



Figure 3: Proximity Profile example with GATT

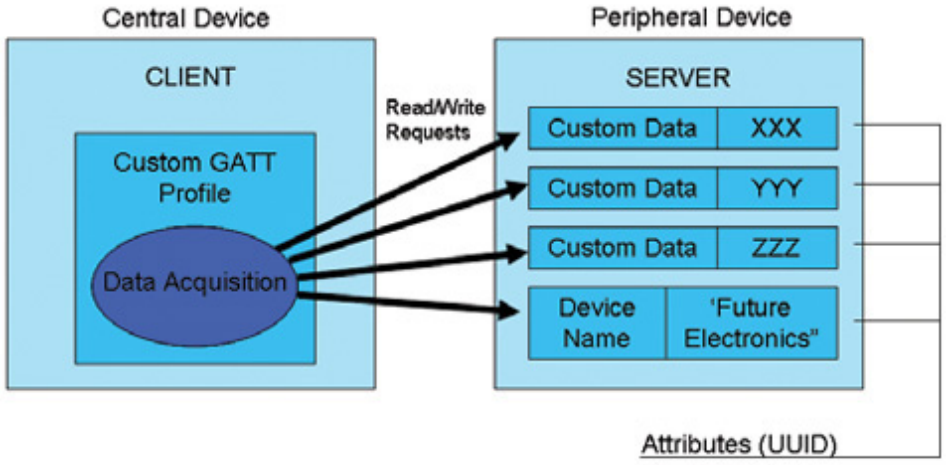



Figure 4: Custom Profile using GATT and custom UUIDs

are compatible. Previously qualified Bluetooth® Smart 4.0 solutions do not need to re-qualify, but for 4.1 certification, the solutions will have to retest again.

**Revision 4.1 changes:**

1.) Added coexistence signaling between Bluetooth® Smart and Cellular technologies such as LTE a. New cellular radios such as LTE/LTE-A Time Division Duplex (TDD) mode (Band 40) often operate at 2.300-2.400GHz. This is in the same band as Bluetooth® Smart. This feature will allow coexistence between the Cellular radio and Bluetooth® Smart seamlessly. 2.) Improved Link Supervision Timeout handling a. The Link Manager between devices can also negotiate reconnection intervals in the case of a connection loss such as moving out of range. Previously, link supervision negotiation was only capable of negotiating how long to maintain the link open if a device moved out of range or loss of RF path. In order to reconnect, the device would have to enter back into the connection process again. This wastes battery power since it is in this mode continuously and there is no deterministic way to know when the other device will return within range to reconnect. The added feature in 4.1 will allow the devices to negotiate time intervals to reconnect to each other again in the case of a link loss. This will save precious battery life as the devices can go into sleep mode between the time intervals. 3.) Dedicated L2CAP oriented channels a. This feature is put in place for the Bluetooth® SIG to build on an IPV6 implementation layer in the future. Bluetooth® Smart 4.0 uses the L2CAP layer with the Attribute protocol and GATT profile. However, data is only available through these layers. A Bluetooth® Smart application will then be able to have a direct connection to the L2CAP layer and channels to have a direct data pipe stream in the same manner as Bluetooth® Classic. 4.) Dual Mode Topology and Link Layer Topology Software Features a. This feature allows a Bluetooth® Smart device to become both a Central and Peripheral device simultaneously. This feature can be very useful to send information between two Peripherals in an ecosystem. For example, a Bluetooth® Smart watch can retrieve information from a heart rate monitor as a Central device but still be a Peripheral device to a smartphone. Previously the data would have to be relayed through the smartphone as a Central device between the watch and heart rate monitor.

**Changes to Bluetooth® Qualification Listing**

On February 1st, 2014, an additional means of funding the Bluetooth® SIG's activities was implemented to meet the demands placed on the alliance with the growth in Bluetooth® products coming to the market.

These changes don't alter any qualification process, and Bluetooth® interoperability testing will continue to support designs past and present. The change addresses the mechanism by which products are qualified and listed. Historically, customers were allowed to reference prequalified components and subsystems for such modules and list their products at no charge. Now, members implementing Bluetooth® wireless technology into a product must complete a Declaration of Compliance (DoC) and a Listing for the

Qualified Design they built, changed, used or branded. A Listing may include multiple products if each product implements the same Qualified Design referenced in the DoC. If a customer creates an OEM product that may be rebranded as another company or several other companies, then they too need to list the product themselves. An End Product Listing (EPL) can only be created by a Bluetooth® SIG member, and an EPL cannot be created by one member on behalf of another company.

The DoC and Listing is followed by a fee for the process. The fee ranges from $2K to $8K per EPL depending on the status of the Lister with the Bluetooth® SIG, Associate Member or Adopter, size and revenue of the Lister. The fees are not associated with Future Electronics or partners. This charge is directly implemented by the Bluetooth® SIG and is separate from the certification and testing costs. Although precertified Bluetooth® and Bluetooth® Smart solutions are available from Future Connectivity Solutions and our partners, the EPL fees still apply.

### Solutions

We at Future Connectivity Solutions (FCS) are committed to providing the best and most efficient Bluetooth Smart solutions to our customers. Systems on Chip (SoC) and module solutions are available from FCS. These solutions are provided with ready-to-go Bluetooth Smart Protocol stacks that are pre-certified with easy profile and application development environments. Sizes are as small as 2.5mm x 2.5mm SoC to 5mm x 5mm fully certified modules. Solutions with 4mA peak with >600nA sleep modes are also available.

Modules and SoCs with integrated slow clocks, buck/boost, BALUN, antenna, with Bluetooth and FCC, IC, CE certification are available now. Roadmap products will integrate more features such as cap-touch IO, integrated accelerometer and MEMS sensors, M0+ apps processors and energy harvesting capabilities. Each solution will have a best fit in different types of Bluetooth Smart Devices. From something as simple as a temperature sensor to last 7 years off of a 180mAh CR2032 coin cell battery to the latest network thermostat with multiple radios, FCS has solutions from the below vendors for Bluetooth Smart and Bluetooth Smart Ready applications.

# RN4020 Bluetooth® Low Energy Module

## Fully-Certified Bluetooth Version 4.1 Module

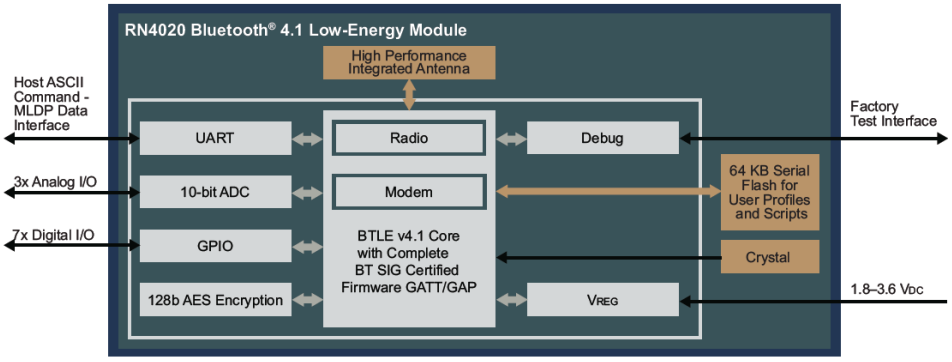
**The RN4020 is a Bluetooth® Smart module for designers who want to easily add low-power regulatory approved wireless capability to their products. As with Microchip's other "RN" Bluetooth modules, the RN4020 provides a turnkey solution with a complete software stack, and RF components on board. The RN4020 includes an onboard antenna and is interfaced and configured via a simple ASCII command interface over UART.**

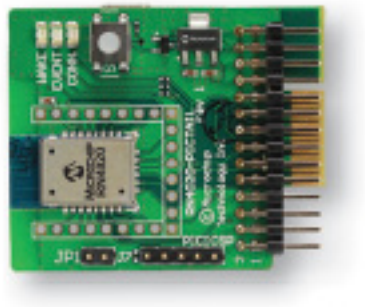
The module supports all standard Bluetooth SIG profiles, and Microchip's Low-Energy Data Profile (MLDP) for custom serial data transfer. Developers can also use scripting to set the RN4020 up for standalone operation where any one of the analog or digital I/Os can be monitored and the values can be transmitted over wireless without the use of a host MCU or processor. This makes the RN4020 an excellent solution for low-power sensors and accessories. The compact 11.5 × 19.5 × 2.5 mm size, enables ease of integration.

As a complete solution interfaced over UART, the RN4020 is a true drop-in solution that is easy to use and easy to prototype, significantly reducing time to market and the expense of regulatory certifications.

With 7 dBm transmit power, the RN4020 achieves a range of 100 meters*, and with a deep sleep mode of less than 1µA, designs can be powered from a single coin cell battery. *Dependent on specific application environment.

### Block Diagram



| Part Number | Description |
|---|---|
| RN4020-V /RM | Bluetooth® 4.1 Class 2 surface mount low-energy module with on-board PCB trace antenna |
| RN-4020-PICTAIL | Evaluation kit for the RN4020 Bluetooth low-energy module. Includes evaluation board with USB interface and mini USB cable |

## FEATURES

- Fully certified Bluetooth version 4.1 module
- On-board embedded Bluetooth low energy stack
- Simple ASCII command interface over UART
- Multiple IOs for control and status
- Secure AES128 encryption
- GAP, GATT, SM, L2CAP and integrated public profiles
- Create custom services using command API
- Data streaming with Microchip's Low Energy Data Profile (MLDP)
- Scripting for standalone module operation with analog and digital data collection
- 7 dBm transmit power for 100m+ range (Dependent on specific application environment)
- Field upgradeable via the UART interface or over the air
- Software-configurable role as peripheral or central, client or server
- Compact form factor, 11.5 × 19.5 × 2.5 mm
- Low-power modes
- UART interface, GPIO, ADC
- 64 KB internal serial Flash
- Castellated SMT pads for easy and reliable PCB mounting
- Environmentally friendly, RoHS compliant
- Bluetooth SIG and worldwide regulatory certification

## APPLICATIONS

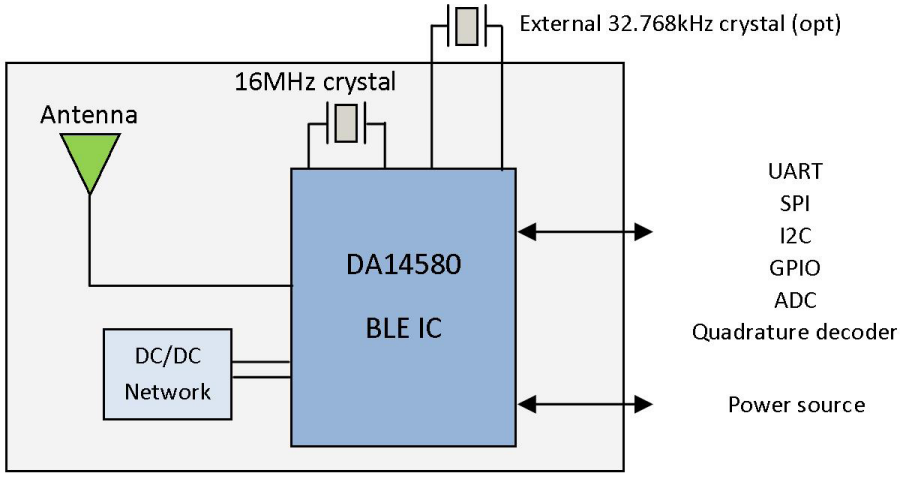
- Wireless pulse sensors
- Proximity sensor applications
- Clinical applications
- Consumer appliances/home automation
- Smart watches/activity trackers
- Mobile device accessories
- Industrial control

## SPECIFICATIONS

- Standard : Bluetooth® 4.1
- Profiles : GATT, GAP, SM, L2CAP
- Frequency : 2.4-2.48 GHz
- Maximum Data Rate : 1 Mbps
- Interface : UART, PIO, AIO, SPI
- Operation Range : 100 meters (Dependent on specific application environment) Sensitivity : -92.5 dBm
- RF TX Power : +7 dBm
- Antenna : PCB Trace

# Low Energy Bluetooth SMART Module : Type ZY

Murata introduces the lowest power consumption Bluetooth Low Energy Module. The Type ZY Bluetooth SMART module supports Bluetooth v4.1 BLE standard. All protocol stacks required for Bluetooth low energy communication are built in, including various healthcare profiles.




| Part Number | Description |
|---|---|
| LBCA2BZZFZ | Product Series: Type ZF / 2.4GHz, Class 3, BLE v4.1, 5.4x4.4x1.0, UART, External Antenna, 0dBm Output Power, Commercial Temp |
| LBCA2HNZYZ-711 | Product Series: Type ZY / 2.4GHz, Class 3, BLE v4.1, 7.4x7.0x1.0, UART, Internal Antenna, 0dBm Output Power, Commercial Temp, Certified |
| LBCA2BZZFZ-TEMP-DK | Mother board Type ZF Daughterboard and J-link Cable for Dialog based BLE |
| LBCA2HNZYZ-TEMP-D-MU | Daughter Board for Type ZY used with Design Kit (Motherboard) |

## FEATURES

- Protocol stacks built in include: BB, LL, L2CAP, GAP, SMP, ATT, GATT
- Integrated system clock, DC/DC circuit and passives
- Operating Temperature Range: -20°C to +85°C
- "ibeacon support"

## APPLICATIONS

- Healthcare and fitness devices Medical devices
- Smartphone peripheral devices
- Remote controls
- Wireless gadgets

## Bluetooth Smart (BT 4.1)

- Bluetooth chipset: DA14580
- Small Size : 7.4 x 7.0 x 1.0 mm (max.)
- Package: LGA

## Bluetooth v4.1

- Operating Frequency Range: 2402MHz to 2480MHz
- TX/RX peak current: 5 mA
- Output Power: 0dBm (typical)
- Host Interface: UART / SPI

## Compliance / Certifications

- RoHs Compliant
- Bluetooth SIG Compliant, Customer responsible for Bluetooth SIG Listing
- FCC/IC Certified with internal antenna

## Benefits

- Small size
- Industrial Temp Range (-40C to +85C)
- Programmable application and profiles
- FCC / IC / CE certified with internal antenna
- Wireless stack on module

# PAN1026 Series Place and Play *Bluetooth*® Module

Dual Mode, Place and Play *Bluetooth* Module

**Introducing Panasonic's Bluetooth dual mode, place and play RF module, the PAN1026 featuring an embedded ARM processor, *Bluetooth* 4.0, serial port profile (SPP), command set API and integrated antenna. This cost-engineered solution is based on a single chip solution that integrates an ARM processor with a *Bluetooth* controller.**

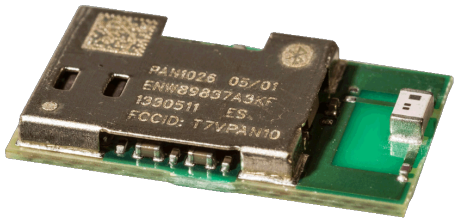
*Bluetooth* 4.0 combines the data rate of *Bluetooth* Classic (3Mb/s) and ultra-fast connection time of *Bluetooth* Low Energy (3mS). *Bluetooth* Low Energy is designed to create low data rate networks using a minimum amount of power. The embedded serial port profile (SPP) frees application resources while the command set API creates a simple but flexible firmware interface. An onboard antenna does away with 2.4GHz RF circuit complexity.

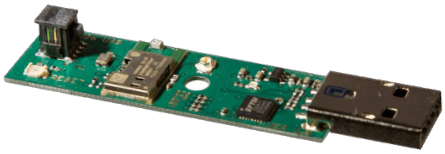
Created with the design engineer in mind, product design cycles are greatly reduced using Panasonic's free of charge reference design and design review services1. PCB layouts are simplified using available Gerber files and minimized with Panasonic's tiny footprint technology. The module is just 15.6mm x 8.7mm x 1.9mm and fully shielded to improve immunity. All Panasonic *Bluetooth* RF modules carry FCC, IC, CE and *Bluetooth* certifications.

The PAN1026 recognizes Apple's authentication coprocessor and supports *Bluetooth* communication2 with Apple's iPhone and iPad®. Connectivity also includes Android, smart phones and all *Bluetooth* enabled devices3.

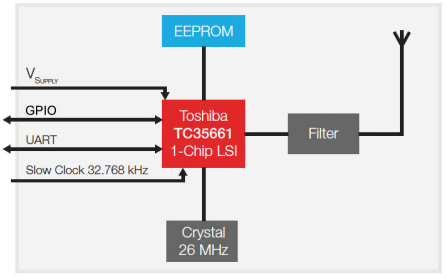
Prototyping and testing are accelerated by utilizing the EVAL_PAN1026 development kit and EasyDualMode software development environment. The EVAL_PAN1026 contains two PAN1026ETU development modules on Panasonic's ETU platform – ETU for Easy to Use. EasyDualMode allows both BLE and *Bluetooth* Classic application development in a single environment. EasyDualMode software is available free of charge on Panasonic's RF module website.

1. Services are reserved for qualified customers. Contact one of Panasonic manufacturer's sales representatives for more information. 2. Apple authentication coprocessor and MFI certification are required for communicating with Apple Idevices. 3. Connectivity requires that devices support *Bluetooth* Serial Port Profile *Apple iPad and iPhone are trademarks of Apple Inc coprocessor and MFI certification are required for communicating with Apple Idevices. 3. Connectivity requires that devices support *Bluetooth* Serial Port Profile *Apple iPad and iPhone are trademarks of Apple Inc



PAN1026 ETU Development Module




PAN1026 Block Diagram

| Technical Characteristics | | |
|---|---|---|
| **Parameter** | **Value** | **Condition** |
| Receiver Sensitivity | -87 dBm typ. | Ideal Signal |
| Output Power | +4 dBm typ. | @ 50 Ohm Antenna Pin |
| Power Supply | 1.7 to 3.6 V | Single Voltage Operation |
| Transmit | 46 mA | ACL, DH1 |
| Receive | 46 mA | ACL, DH1 |
| Operating Temperature | -40 to +85°C | |

| Part Number | Description |
|---|---|
| ENW-89837A3KF | PAN1026 *Bluetooth* Module, SPP, Integrated Antenna |
| EVAL_PAN1026 | Evaluation Kit for the PAN1026 Class 2 *Bluetooth* Low Energy SPP Module |

## FEATURES

- *Bluetooth* Version 4.0
- Industrial Temperature Range, -40 to +85°C
- High Sensitivity: -87dbm
- Output Power: 4dbm
- Single VCC Supply: 1.7 to 3.6 V
- Interfaces: UART up to 4.3 Mbps
- Integrated ARM 32-Bit Processor

## APPLICATIONS

- iOS and Android Devices
- Wireless Sensors
- Cable Replacement
- Instrumentation
- Medical
- Automotive

# SPBT2632 series

## Micro-sized Bluetooth modules

**ST's latest micro-sized Blue Module series offers a fast, flexible and affordable Bluetooth solution on a highly reliable platform based on the most advanced Bluetooth technology. Modules, optimized in terms of performances and costs, support the latest Bluetooth Classic specification V3.0 and are compatible with previous V2.1 + EDR.**

The Bluetooth stack is embedded in ST's Blue Modules with the profiles and a user-friendly application that ensures a simple and effective way to use the modules via AT commands.

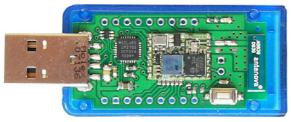
The modules enables communication with Android, smartphones and most Bluetooth enabled devices that support the serial port profile, including the Apple iOS Bluetooth enabled devices. The external Apple authentication coprocessor and MFI certification are required.
The modules are fully qualified, listed on the SIG website according to EPL (end product listing) rules and RoHS compliant.

## Evaluation / Demo Tools

The STEVAL-SPBT demonstration board is a design tool to evaluate the SPBT2632C1A.AT2 and SPBT2632C2A.AT2 modules in a quick and simple way.The dongle includes the RF antenna and the USB connector.The USB connector is used to connect the dongle to a PC, to access the Bluetooth® module, and to supply the dongle.

The STEVAL-SPBT includes downloaded FW, enabling the user to create a Bluetooth® link with simple AT commands. The AT command list is detailed in the User Manual UM1547.
The AN4127 application note describes how to get started with the STEVAL-SPBT3ATV3. The AN4128 application note describes how to get started with the STEVAL-SPBT4ATV3.

The modules are fully qualified, listed on the SIG website according to EPL (end product listing) rules and RoHS compliant.



STEVAL-SPBT USB dongle, evaluation board

## FEATURES

- Bluetooth® radio
- Fully embedded Bluetooth® v3.0 with profiles
- Class 1 (range up to 60m LOS) or class 2 module
- Complete RF ready module
- 128-bit encryption security
- Integrated antenna
- Multipoint capability
- ST micro Cortex-M3 microprocessor up to 72 MHz (256 kb Flash, 48 kb RAM memory)
- Modem transmitter speed
- The maximum transmission speed depends on the service supported
- 1 LPO input (LPO on-board for class1 module)
- User interface AT2 command set (abSerial)
- Firmware upgrade over UART
- FCC and Bluetooth® qualified
- EPL (end product listing) fulfilled
- Single voltage supply: 2.5 V typical
- Small form factor: 15 x 27 x 2.9 mm for class1 module
- Micro-sized form factor 11.6 x 13.5 x 2.9 mm for class2 module
- Operating temperature range: -40 °C to 85 °C

## APPLICATIONS

- Serial cable replacement
- M2M industrial control
- Service diagnostics
- Data acquisition equipment
- Machine controls
- Sensor monitoring
- Security systems
- Mobile health

## Hardware block diagram

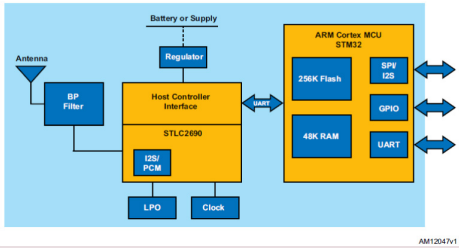



Figure 1. SPBT2632C1A.AT2 module block diagram

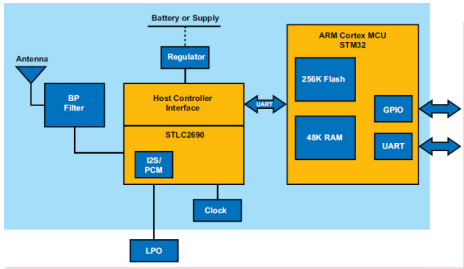
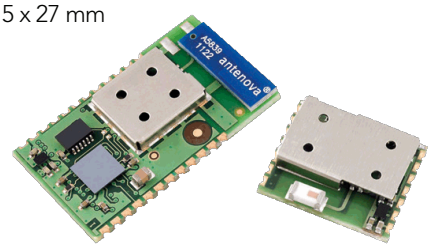



Figure 2. SPBT2632C2A_AT2 module block diagram

SPBT2632C1A.AT2
15 x 27 mm



SPBT2632C2A.AT2
11.6 x 13.5 mm

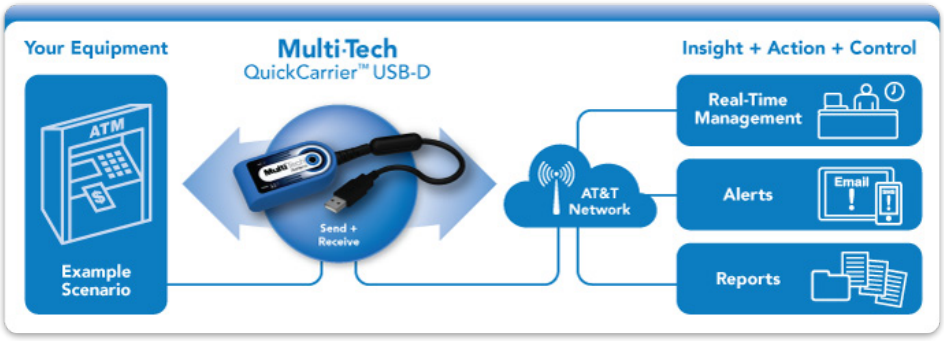
| Part Number | Description |
|---|---|
| STEVAL-SPBT3ATV3 | USB dongle, evaluation board for SPBT2632C2A.AT2, class 2 module |
| STEVAL-SPBT4ATV3 | USB dongle, evaluation board for SPBT2632C1A.AT2, class 1 module |
| SPBT2632C2A.AT2 | Module on PCB : SPBT2632 Series 72 Mhz 7 I/O Class 2 Bluetooth v3.0 Module w/ Antenna |
| SPBT2632C1A.AT2 | Evaluation Kit for the PAN1026 Class 2 Bluetooth Low Energy SPP Module |

# QuickCarrier™ USB-D

## First-ever Industrial M2M-quality Cellular USB Dongle for Long Term Supply

**All QuickCarrier™ USB-D modems are fully certified and carrier approved, so you can get to market extremely fast, allowing applications to immediately start obtaining the benefits of M2M cellular connectivity.**

Designed specifically for industrial M2M communications applications that require consistent behavior and long term supply commitments well in excess of 5 years. The QuickCarrier USB-D provides a lengthy and stable lifecycle that is durable, designed to deliver reliable data connectivity, and is very easy to deploy.




## FEATURES

- 3G HSPA+ and EV-DO performance USB 2.0 interface
- Drivers for Windows® and Linux®
- Connection Manager software for Windows applications
- Internal antenna
- Short Message Service (SMS)
- Certified and Carrier Approved
- Standard two-year warranty

## BENEFITS

- Fully certified and Network Operator Approved
- Quick deployments to shorten time to market
- Long and stable lifecycles
- Industrial grade temperature range
- Rugged and durable
- Designed specifically for M2M cellular applications

## Why the QuickCarrier™ USB-D versus subsidized consumer grade cellular dongles?

- 5+ year product life cycle
- HSPA+ models compatible with over 80% of GSM providers worldwide
- Globally approved for use in US, Canada, EU and beyond
- Industrial temperature ranges of -40° to +50°C (-40° to +122°F)
- No drivers required for newer Linux Kernels
- Fast time to market for connected applications

## Where will the Quick Carrier USB dongle fit?

- SMS alerting
- Remote access connectivity – Windows & Linux support
- Quick cellular connectivity for embedded Linux development platforms with USB
- Portable medical devices
- POS Kiosks
- ATMs

| Part Number | Description |
|---|---|
| MTD-H5 | 3G Hepta-band HSPA+, 21 Mbps 2.0 USB Cellular Dongle |
| EMTD-EV3-N3 | 800 / 1900 Mhz 3.1 Mbps 3G EV-DO USB Cellular Dongle (Verizon) |
| MTD-EV3-N2 | 800 / 1900 Mhz 3.1 Mbps 3G EV-DO USB Cellular Dongle (Sprint) |
| MTD-EV3-N16 | 800 / 1900 Mhz 3.1 Mbps 3G EV-DO USB Cellular Dongle (Aeris) |

# Multi-Tech

## MTD-H5 & MTD-EV3

| Technical Specifications | | |
|---|---|---|
| **Model** | **MTD-H5** | **MTD-EV3** |
| Performance | HSPA+ | EV-DO |
| Frequency Band | 3G: Hepta-band 800/850/900/AWS 1700/1900/2100 MHz 2G: Quad-band 850/900/1800/1900 MHz | Dual-band 800/1900 MHz |
| Packet Data* | Up to 21.0 Mbps downlink Up to 5.76 Mbps uplink | Up to 3.1 Mbps downlink Up to 1.8 Mbps uplink |
| SMS | Point-to-Point Messaging, Mobile-Terminated SMS, Mobile-Originated SMS | Point-to-Point Messaging, Mobile-Terminated SMS, Mobile-Originated SMS |
| USB | USB 2.0 High Speed Compatible | USB 2.0 High Speed Compatible |
| IP Protocols | TCP/UDP/FTP/SMTP | TCP/UDP/FTP/SMTP |
| Operating Voltage | 5V via USB Bus | 5V via USB Bus |
| **Connectors** | | |
| SIM Connector | Mini SIM; 1.8 and 3V | N/A |
| **Physical Description** | | |
| Physical Dimensions (L x W x H) | 3.1" x 1.58 x 0.74" (7.87 cm x 1.88 cm) Includes 7" (17.3 cm) integrated USB cable | 3.1" x 1.58 x 0.74" (7.87 cm x 4.01 cm x 1.88cm) Includes 10.5" (26.5 cm) integrated USB cable |
| **Environmental** | | |
| Operating Temperature | -40° to +122° F (-40° to +50°C) | -40° to +122° F (-40° to +50°C) |
| Storage Temperature | -40° to +185° F (-40° to +85°C) | -40° to +185° F (-40° to +85°C) |
| Humidity | Relative humidity 15% to 93% noncondensing | Relative humidity 15% to 93% noncondensing |
| **Certifications** | | |
| Regulatory | FCC Part 15 Class B (US), IC (Canada), R&TTE (EU Economic Area) | FCC Part 15 Class B (US) |
| Safety | UL60950-1 (US), cUL60950-1 (Canada), IEC60950-1 (EU Economic Area) | UL60950-1 (US) |
| Network | AT&T, T-Mobile, Rogers, EU Carriers Pending: Bell, Telus | Verizon, Sprint, Aeris |

# AirPrime SL Series Development Kit

**A complete development kit which provides all the tools and accessories you need to test concepts, deliver prototypes or develop an end user application with an AirPrime SL Series wireless module and the Open AT Application Framework.**

Designed to suit the needs of manufacturers of small host devices in high-volume production, the AirPrime SL Series offers EDGE, HSDPA, HSPA+ and EV-DO Rev A connectivity in a compact and lightweight form factor based on standard 25×30 mm LGA (Land Grid Array).

AirPrime SL Series offers smart connectivity for consumer and industrial applications. Its standard 25 x 30 mm LGA (Land Grid Array) package allows fully automated manufacturing for high-volume production.
Available in multiple air interfaces versions (EDGE, HSDPA, HSPA+, CDMA 1xRTT and EV-DO), the AirPrime SL Series presents an easy upgrade path to next-generation network technologies. With its application framework and cloud-based device management services, the smart AirPrime SL Series accelerates your M2M deployment. AirPrime SL Series modules have a solid track record in several M2M sectors such as transportation, energy, industrial, security, sales & payment, networking, fi eld service and healthcare.

**System requirements :**
Minimum PC configuration for running the Open AT Application Framework: Java 1.6.x and Windows® XP, Vista, 7

**Network Technology :**
**HSDPA, EDGE**

**Frequency Bands :**
EDGE/GPRS/GSM 850/900/1800/1900 MHz, WCDMA 850/2100 MHz, WCDMA 850/2100 MHz, WCDMA 850/2100 MHz

**Carrier Certifications :**
AT&T, NTT DoCoMO, Rogers, Telstra, Vodacom, Vodafone

**Regulatory Certifications :**
R&TTE, CE, GCF-CC, FCC, PTCRB, RoHS Compliant

**Antenna Diversity Support :**
No

**Operating temperature :**
-40°C to +85°C

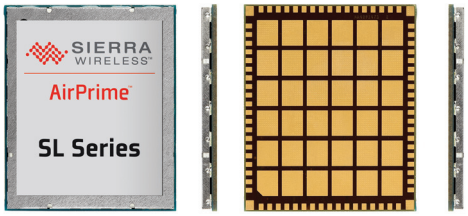
**Form factor :**
Solder-down / SMT Mounting

## BENEFITS

- High scalability for new network technologies
- A single small form factor to adress multiple air interfaces for global deployment
- Resists industrial environments and extended temperatures
- Available with an application framework to simplify software development
- Remote upgrade and monitoring via a cloud platform

## PACKAGE CONTENTS

- 1 SL Mechanical Development Kit Board
- 1 SL8080T sample
- 1 SL8082T sample
- 1 SL8084T sample
- 1 SL6087 sample
- 2 GSM Antenna
- 1 GPS Antenna
- 1 Headset
- 1 Telephone handset
- 1 RJ9 cable
- 1 USB cable
- 1 RS232 cable
- 1 Set of board to board connectors
- 1 Power supply
- 1 USB Flash disk




| Part Number | Description |
|---|---|
| SL8090-1101846 | The AirPrime SL809x is one of the smallest high-speed HSPA+ modules in the industry, featuring voice, antenna diversity, and GPS support. It includes quad-band GSM/GPRS/EDGE connectivity as well. |
| SL8092-1101380 | SL Series HSPA+ 14 Dual-band (900/2100) GPS/Voice Module (Generic Carrier) |

# GPS and GNSS Modules

**Linx strives to make every engineer a hero in record time™ by minimizing the risk, delays and technical challenges for design engineers to implement wireless in their products. Unlike other module producers, every aspect of our product and design experience is specifically crafted to achieve Wireless Made Simple®.**

Linx GPS and GNSS receiver modules allow the easy and cost-effective addition of location and tracking capabilities to virtually any product. The receivers are in a hybrid modular form that requires no external RF components except an antenna. This makes them simple to apply, even by engineers without RF or GPS/GNSS design experience.

The GPS receivers support the United States Navstar GPS system. The GNSS receivers support Navstar as well as Russia's GLONASS and Europe's Galileo systems.

## FEATURES

- High sensitivity (–161dBm)
- Fast TTFF at low signal levels
- ±11ns 1PPS accuracy
- Battery-backed SRAM
- No programming necessary

## APPLICATIONS

- Positioning and Navigation Location and Tracking
- Security / Loss-Prevention Surveying
- Fleet Management
- Logistics

## BENEFITS

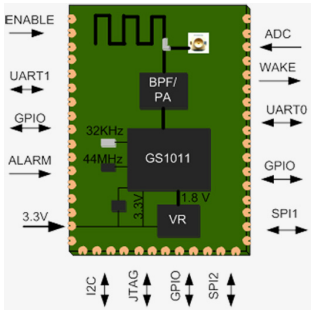
- Improve performance: built-in LNA provides excellent sensitivity and performance, particularly when using passive antennas
- Low power: 20mA supply current while tracking. Duty cycle mode to further reduce power consumption.
- Quick start times: cold start under 15 seconds using AGPS (3-day satellite prediction); hot start under 1 second
- Better reliability: tracks multiple positioning systems simultaneously
- Simplify design: modules and antennas are the only RF components you need; no tuning required
- Easy integration: easy to integrate, even by engineers who have no prior experience with GPS modules
- Streamline production: save time and money with modules that are already tested
- Rapid development: development system allows full interfacing and color display

**Linx Technologies - GPS and GNSS Modules**

| | | | | | | |
|---|---|---|---|---|---|---|
| Series | R4 | RM | F4 | FM | GM | TM |
| System | GPS | GPS | GPS | GPS | GNSS | GNSS |
| Size (mm) | 15.0 x 13.0 | 15.0 x 13.0 | 15.0 x 13.0 | 15.0 x 13.0 | 15.0 x 13.0 | 10.1 x 9.7 |
| Supply Voltage (VDC) | 3–3.6 | 3–4.3 | 1.71–1.89 | 3–4.3 | 3–4.3 | 3–4.3 |
| Position Accuracy (m) | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| Current Consumption | | | | | | |
| Peak (mA) | 122 | 44 | 130 | 66 | 150 | 156 |
| Acquisition (mA) | 56 | 14 | 46 | 14 | 24 | 28 |
| Tracking (mA) | 33 | 12 | 27.5 | 12 | 16 | 20 |
| Sleep (µA) | 430 | 135 | 20 | 150 | 365 | 365 |

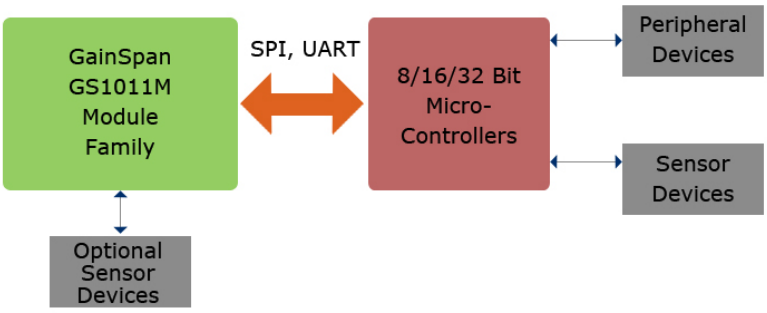
| Part Number | Description |
|---|---|
| RXM-GPS-FM | FM Series GPS Receiver Module |
| EVM-GPS-FM | FM Series Evaluation Module |
| MDEV-GPS-FM | FM Series Master Development System |
| RXM-GPS-RM | RM Series GPS Receiver Module |
| EVM-GPS-RM | RM Series Evaluation Module |
| MDEV-GPS-RM | RM Series Master Development System |
| RXM-GPS-F4 | F4 Series GPS Receiver Module |
| EVM-GPS-F4 | F4 Series Evaluation Module |
| MDEV-GPS-F4 | F4 Series Master Development System |
| RXM-GPS-R4 | R4 Series GPS Receiver Module |
| EVM-GPS-R4 | R4 Series Evaluation Module |
| MDEV-GPS-R4 | R4 Series Master Development System |
| RXM-GNSS-GM | GM Series GNSS Receiver Module |
| EVM-GNSS-GM | GM Series Evaluation Module |
| MDEV-GNSS-GM | GM Series Master Development Module |
| RXM-GNSS-TM | TM Series GNSS Receiver Module |
| EVM-GNSS-TM | TM Series Evaluation Module |
| MDEV-GNSS-TM | TM Series Master Development System |

# GS1011M Low Power Wi-Fi Module Family




**The GS1011M family of fully certified modules provides multiple serial UART or SPI interfaces, enabling connection to any embedded design utilizing a 8/16/32-bit microcontroller via simple commands. The module supports data rates up to 11 Mbps, is compliant with 802.11b and meets regulatory and Wi-Fi Alliance requirements.**

Multiple software configurations are available for the stack running on the module. For applications utilizing a small 8 bit microcontroller host, the module supports a serial to Wi-Fi function and runs the full Wi-Fi and TCP/IP networking stacks, completely offloading the host. For applications utilizing more powerful microcontrollers, the networking stack and services can reside on the host while the module provides the IP to Wi-Fi functionality.




| Part Number | Description |
|---|---|
| GS1011MIP | GS1011M Series 2.4 - 2.497 GHz 8 dbm Wi-F Module w/ PCB Trace Antenna |
| GS1011MIE | FGS1011M Series 2.4 - 2.497 GHz 8 dbm Wi-F Module w/ External Antenna (u.FL) |
| GS1011MEP | GS1011M Series 2.4 - 2.497 GHz 18 dbm Wi-F Module w/ PCB Trace Antenna |
| GS1011MEE | GS1011M Series 2.4 - 2.497 GHz 18 dbm Wi-F Module w/ External Antenna (u.FL) |
| GS1011MIC | GS1011MIC Evaluation Board with Connectorized Module |
| GS1011MIPS | Low power Wi-Fi module |
| GS1011MEES | Longest Range |
| GS1011MEPS | GS1011M Series 2.4 - 2.497 GHz 18 dbm Low Power Wi-F Module w/ PCB Trace Antenna |
| GS1500M | GS1500M Series 2.484 GHz 14 dbm WiFi Module w/ PCB Trace or Ext Antenna (uFL) |

## FEATURES

- Operates with standard 802.11 b/g/n access points at speed up to 11 Mbps (802.11b)
  - Infrastructure, Limited AP or Adhoc
- Two serial UART ports
  - Data rates of up to 921.6kbps
- Two SPI ports
  - Supports SPI Master / Slave modes
  - Data rate of up to 3Mbps
- Firmware provides full Wi-Fi and net-working stack services including TCP/UPD/IP, HTTP, DNS, DHCP and SSL
- 802.11i Security
  - WEP, WPA/WPA2 Persona

## APPLICATIONS

- Single power source of 3.3V FCC/IC/ETSI, Wi-Fi Alliance Certified Rich I/O interfaces : SPI, UART, GPIO, I2C, ADC, JTAG
- Healthcare and fitness
- Smart Energy
- Industrial Controls
- Commercial/Building Automation
- Consumer Electronics

## BENEFITS

- Benefits brings Wi-Fi and web connectivity to any device with a microcontroller and serial HOST interface (UART or SPI).
- Reduces development time, testing and certification burden, accelerating time to market
- Fully contained solution minimizes host processor loading when needed
- Easy device provisioning through Limited AP (embedded web pages) or Wi-Fi Protected Set-up (WPS)
- Ultra low power consumption through dynamic power management – Sleep, Deep Sleep, Standby.

# 802.11a/b/g/n Plus Bluetooth SDIO Module

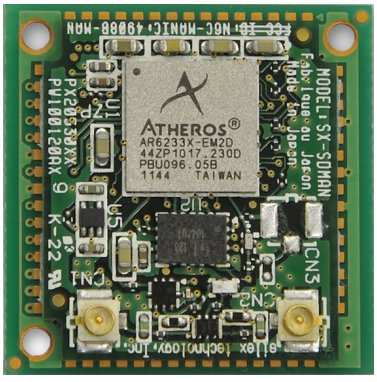
**Wireless LAN Module for Mobile Devices with Enterprise Reliability**

**The Silex SX-SDMAN is a dual-band 802.11a/b/g/n plus Bluetooth SDIO module that is based on the SX-SDPAN (Qualcomm Atheros AR6233). The SX-SDMAN brings 802.11n throughput, range and power eciency to portable devices including patient monitors, printers, handheld terminals and more.**

The SX-SDMAN integrates an external 5 GHz Front End Module (FEM) and is pre-tuned for the most optimized dual-band WLAN performance. The radio module design approach also saves cost as the SX-SDMAN provides FCC/IC/ETSI/TELEC modular certication.

The SX-SDMAN provides superior product quality. Silex has validated that our design meets IEEE standards and each module is individually tested during the production process. This ensures that each of our products will perform to our published specication.

In order to expedite your product development process, Silex can provide both hardware and software engineering services including custom driver development, as well as turnkey product design and manufacturing.




## FEATURES

- IEEE 802.11a/b/g/n conformity (2.4 GHz & 5 GHz)
- Single stream 1 x 1 SISO technology and 40 MHz bandwidth mode for 5 GHz
- Data rates of 1 – 54 Mbps for 802.11b/g, 6 – 54 Mbps for 802.11a and 6.5 – 135 Mbps for 802.11n
- Supports IEEE 802.11e, IEEE 802.11h and IEEE 802.11i
- Supports SDIO 2.0 as host IF of wireless LAN
- Supports Bluetooth 4.0 + LE dual mode
- Supports TDMA Wi-Fi/Bluetooth coex-istence
- Supports UART and USB as the host IF of Bluetooth
- Calibrated Tx Power per module
- FCC/IC/ETSI/TELEC modular certication
- Connector mount and surface mount versions

## APPLICATIONS

- The SX-SDMAN is for low power / battery operated devices like portable medical devices, industrial tablet de-vices, barcode scanners, mobile print-ers, and many more. It integrates both WLAN and BT functionality in a single board design to provide a cost-effective WiFi and Bluetooth co-existence imple-mentation.
- The SX-SDMAN brings 802.11n throughput, range and power efficiency to portable devices including patient monitors, printers, handheld terminals and more.

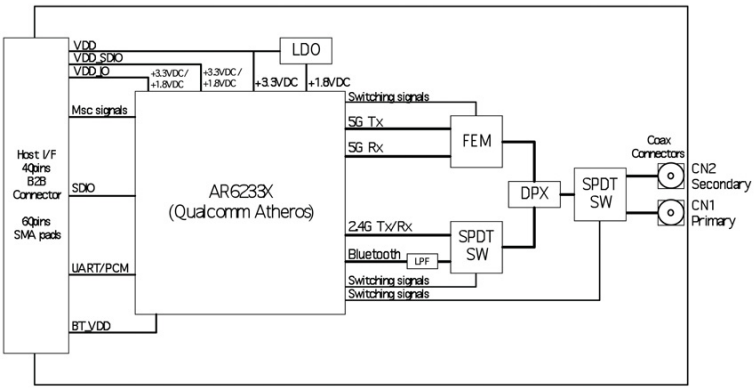
## DRIVER SUPPORT

Reference Drivers :

- Linux
- Android
- Windows Embedded Compact 7
- QNX Neutrino
- Green Hills Intergrity
- Mentor Graphics Nucleus

## SPECIFICATIONS

- SX-SDMAN-2830C / SX-SDMAN-2830S
- Chipset : Qualcomm Atheros AR6233
- Host Interface : SDIO V 2.0 (4-bit, 1-bit)
- Operating Voltage : 3.30 VDC +/- 5%
- Radio Specifications : 802.11b/g/n 2.412 – 2.484 GHz 802.11a/n 5.18 – 5.825 GHz
- Baseband Specifications : CSMA/CA media access; DSSS, OFDM
- Bluetooth Specifications : BT3.0+HS, BT4.0, Class 1.5
- Operating Temperature : -10 to +70 degrees C
- Connector Mount Dimensions : 24.0 x 24.0 x 4.4 mm (W x H x D)
- Surface Mount Dimensions : 19.0 x 22.0 x 2.2 mm (W x H x D)
- On-Chip Functionality : Single-chip MAC/BB/RF/PA/LNA
- Frequency Band : 2.4 GHz / 5 GHz
- Network Standard : 802.11a, 802.11b, 802.11g, 802.11n (1-stream)
- Modulation Modes : OFDM (64QAM, 16QAM, QPSK, BPSK), DSSS (CCK, DQPSK, DBPSK), DSSS-OFDM (64QAM, 16QAM, QPSK, BPSK)
- Hardware Encryption : WEP, WPA/WPA2 (TKIP/AES-CCMP), WAPI
- Quality of Service (QoS) : WMM, WMM-PS, 802.11e
- Supported Data Rates :
  IEEE 802.11b – 1-11 Mbps
  IEEE 802.11g – 6-54 Mbps
  IEEE 802.11a – 6-54 Mbps
  IEEE 802.11n HT20 – 6.5 – 65.0 Mbps
  IEEE 802.11n HT40 – 13.5 – 135.0 Mbps
- Bluetooth : BDR/EDR/LE

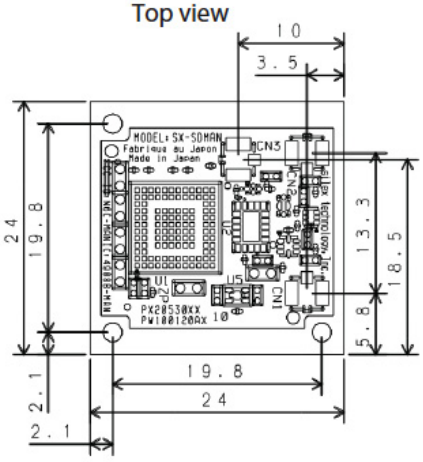



LDO : Low DropOut regulator
FEM : RF Front End Module
DPX : Diplexer
LPF : Low Pass Filter
SPDT SW : Single Pole Double Throw Switch

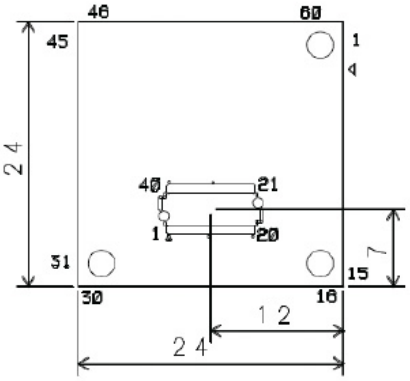
## Dimensions and Architecture

### Connector Mount

Top view

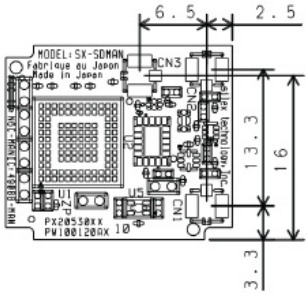



Bottom view

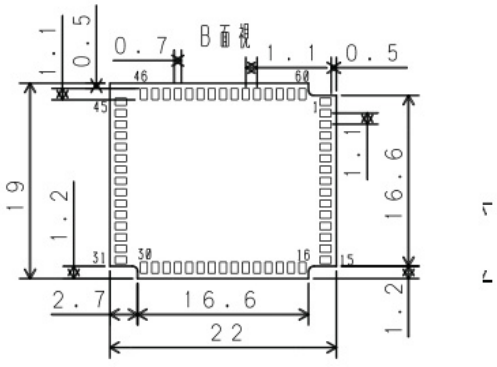



### Surface Mount

Top view




Bottom view




| Part Number | Description |
|---|---|
| SX-SDMAN-2830C | Connector Mount, Bulk Package |
| SX-SDMAN-2830C-SP | Connector Mount, Sample Pack |
| SX-SDMAN-2830S | Surface Mount, Bulk Package |
| SX-SDMAN-2830S-SP | Surface Mount, 10 Unit Sample Pack |
| SX-6K3-EVK-SD | AR6003 Dual Band Evaluation Kit (Includes SX-SDCAN-2830) |

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